Operating Instructions

BRINKMANN Immersion Pumps

(S)TC40…(S)TC160

BRINKMANN PUMPS, Inc.
47060 Cartier Drive
Wixom, MI 48393
USA
Phone: +1 248 926 9400
Fax.: +1 248 926 9405

www.brinkmannpumps.com
sales@brinkmannpumps.com

Subject to change without prior notice.

Order - No.: BA6300 ENGLISH

© Brinkmann Pumps, Inc.
Edition 08/2015

Brinkmann Immersions Pumps of the Series (S)TC40 ... 160

Contents

1 Indication to the manual 2
2 Description of the Product 2-3
3 Safety instructions 4
4 Transportation and Storage 4
5 Installation and Connection 5
6 Start-up / Shut-down 6
7 Operation 6
8 Servicing and Maintenance 6
9 Troubleshooting Guide 7
10 Spare Parts 8
11 Repair 9
12 Disposal 9
13 WARRANTY 10

1 Indication to the manual

This operating manual gives basic instructions which are to be observed during installation, operation and maintenance of the pump. It is therefore imperative that this manual be read by the responsible personnel and operator prior to assembly and commissioning. It is always to be kept available at the installation site.

1.1 Identification of safety instructions in the operating manual

Safety instructions given in this manual non-compliance with which would affect **safety** are identified by the following symbol

Safety sign according with ISO 3864 – B.3.1

or where **electrical safety** is involved, with:

Safety sign according with ISO 3864 – B.3.6

Where non-compliance with the safety instructions may cause a risk to the machine and it's function the word

ATTENTION

is inserted.

2 Description of the Product

2.1 General description of the pump

Pumps of this type are multi-stage rotary pumps. The immersed parts of the pump are of plastic PBTP. Series (S)TC use closed impellers in order to minimizing power consumption and to optimize hydraulic pump efficiencies.

The pump shaft and the motor shaft are connected by a coupling. The pump shaft is sealed by a rotating mechanical seal. The pump is protected again impurity by a filter. Pump and motor form a compact and space-saving unit.

Vertically mounted pumps are equipped with a mounting flange. The pump end immerses into the tank and the motor extends vertically above the tank.

2.2 Intended use

The immersion pumps of the series (S)TC have been especially developed to supply internally cooled tools with coolant fluid within the limiting application in accordance with table 1.

Limit of Application (Table 1)

Type	(S)TC40	(S)TC63…160
Mediums	Industry water, coolant, cooling- and cutting-oils	
Kinetic viscosity of the medium	…115 SSU *(...25 mm²/s)*	…200 SSU *(...45 mm²/s)*
Temperature of medium	30 … 140 °F *(0 ... 60 °C)*	
Particle-size in the medium	0.04 Inches *(1 mm)*	
max. operation pressure	305 PSI *(21 bar)*	
min. delivery volume	1% of Q max.	
Dry running	The pumps are not suitable for dry running.	
Motor cycle time per hour	Motors less 4.0 HP *(3 kW)* max. 200 from 4.0 HP *(3 kW)* to 5.4 HP *(4.0 kW)* max. 40	
Ambient temperature	104 °F *(40 °C)*	
Set-up altitude	3280 ft *(1000 m)*	

ATTENTION

The pumps are to be operated within their design limits. Applications outside of these limits are not approved. The manufacturer is not responsible for any damages resulting from use of the pumps in such applications.

2.3 Technical data

Type	Max. del. pressure spec. weight 1 PSI	*bar*	Max. del. volume GPM	*l/min*	Pipe connec-tion TC G	STC	Height **H** Inches	*mm*	Depth of immersion **h** Inches	*mm*	Weight [1] TC lbs	*kg*	Power HP	*kW*	Noise level [2] dBA / 60 Hz
(S)TC40S 260	68	*4.6*	22.0	*85*	G ¾	G 1	10.9	*276*	10.24	*260*	24	*11*	0.75	*0.55*	61
340	102	*7.0*	22.5	*87*			11.6	*294*	13.19	*335*	29	*13*	1.15	*0.85*	61
430	147	*10.0*	22.5	87			13.3	*337*	16.93	*430*	49	*22*	2.0	*1.5*	68
550	203	*14.0*	23.0	*88*			13.3	*337*	21.65	*550*	51	*23*	2.3	*1.7*	68
720	280	*19.0*	23.5	*90*			15.2	*387*	28.34	*720*	64	*29*	3.5	*2.6*	68
(S)TC63S 270	65	*4.4*	35	*135*	G ¾	G 1	12.4	*314*	10.83	*275*	31	*14*	1.5	*1.1*	61
350	92	*6.3*	36	*139*			13.3	*337*	13.39	*340*	49	*22*	2.0	*1.5*	68
440	135	*9.2*	36	*139*			13.3	*337*	17.32	*440*	51	*23*	2.3	*1.7*	68
560	190	*13.0*	37	*142*			14.3	362	22.24	*565*	64	*29*	3.0	*2.2*	68
750	266	*18.2*	38	*146*			16.8	*427*	29.72	*755*	90	*41*	4.4	*3.3*	72
(S)TC160S330	54	*3.7*	80	*308*	G 1 ¼		13.3	*337*	12.80	*325*	46	*21*	2.0	*1.5*	68
430	80	*5.5*	80	*308*			13.3	*337*	16.73	*425*	49	*22*	2.3	*1.7*	68
580	128	*8.8*	82	*316*			15.2	*387*	22.83	*580*	66	*28*	3.5	*2.6*	68
740	170	*11.6*	83	*320*			16.8	*427*	28.94	*735*	88	*40*	4.4	*3.3*	72

1) Weight STC = Weight TC + 4.4 lbs (2 kg)

2) Noise emissions measured in accordance with DIN 45635 at a distance of 39.37 Inches *(1 m).*

The motor is surface-cooled and compliant with
DIN IEC 34 and EN 60034 (protection degree IP 55).

3 Safety instructions

When operating the pump, the safety instructions contained in this manual, the relevant national accident prevention regulations and any other service and safety instructions issued by the plant operator are to be observed.

3.1 Hazards in the event of non-compliance with the safety instructions

Non-compliance with the safety instructions may produce a risk to the personnel as well as to the environment and the machine and results in a loss of any right to claim damages.
For example, non-compliance may involve the following hazards:

- Failure of important functions of the machines/plant
- Failure of specified procedures of maintenance and repair
- Exposure of people to electrical, mechanical and chemical hazards
- Endangering the environment due to hazardous substances being released

3.2 Unauthorized modes of operation

- Pump may not be used in potentially explosive environments**!**
- Pump and discharge piping are not designed to hold any weight and may not be used as a step ladder.

3.3 Remaining Risk

Risk of Injury!
Risk of squeezing or crushing body parts when installing or removing the pump exists. Proper and secured lifting tools must be used.

Risk of burns!
The pump must have cooled down sufficiently prior to commencing any repair, maintenance or installation.

3.4 Qualification and training of operating personnel

The personnel responsible for operation, maintenance, inspection and assembly must be adequately qualified. Scope of responsibility and supervision of the personnel must be exactly defined by the plant operator. If the staff does not have the necessary knowledge, they must be trained and instructed, which may be performed by the machine manufacturer or supplier on behalf of the plant operator. Moreover, the plant operator is to make sure that the contents of the operating manual are fully understood by the personnel.

3.5 Safety instructions relevant for operation

- If hot or cold machine components involve hazards, they must be guarded against accidental contact.
- Guards for moving parts (e.g. coupling) must not be removed from the machine while in operation.
- Any leakage of hazardous (e.g. explosive, toxic, hot) fluids (e.g. from the shaft seal) must be drained away so as to prevent any risk to persons or the environment. Statutory regulations are to be complied with.
- Hazards resulting from electricity are to be prevented (see for example, the VDE Specifications and the bye-laws of the local power supply utilities).
- The pumps' stability against falling over is not ensured unless it is properly mounted onto the tank.
- The female threads on the motor MUST NOT be used to lift the entire pump and motor assembly.

3.6 Safety instructions relevant for maintenance, inspection and assembly work

Any work on the machine shall only be performed when it is at a standstill, it being imperative that the procedure for shutting down the machine described in this manual be followed.
Pumps and pump units which convey hazardous media must be decontaminated.
On completion of work all safety and protective facilities must be re-installed and made operative again.
Prior to restarting the machine, the instructions listed under "Start up" are to be observed.

3.7 Signs on the pump

It is imperative that signs affixed to the machine, e.g.:

- arrow indicating the direction of rotation
- symbols indicating fluid connections

be observed and kept legible.

3.8 Unauthorized alterations and production of spare parts

Any modification may be made to the machine only after consultation with the manufacturer. Using spare parts and accessories authorized by the manufacturer is in the interest of safety. Use of other parts may exempt the manufacturer from any liability.

4 Transportation and Storage

Protect the pump against damage when transporting.
The pumps may only be transported in a horizontal position and hooks or straps must be attached on the motor and pump end.
Do not use the pump shaft for connecting any transportation aids such as hooks or straps.
Pumps must be drained prior to their storage.
Store pump in dry and protected areas and protect it against penetration of foreign bodies.
Always store pump above the freezing point!

5 Installation and Connection

5.1 Mechanical installation

During any assembly or disassembly process the pumps must be secured against tipping trough ropes for example at all times.

Pumps must be mounted securely. Piping, tank and pumps must be mounted without any tension.

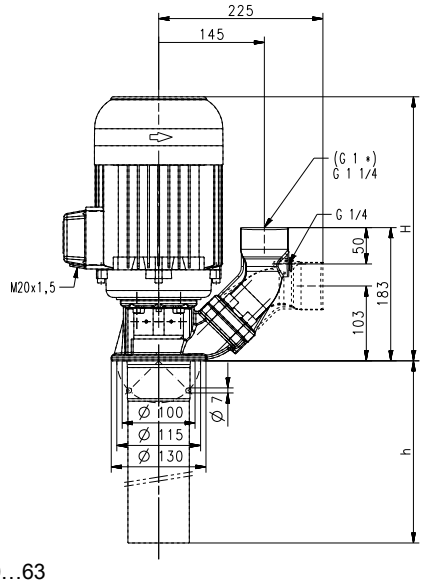
The inlet is at the bottom of the immersed pump body. The distance between the inlet and the tank bottom must be so large that the inlet can not be blocked by deposits during longer shutdowns.

The leakage is collected in a leakage chamber and drained off by the leakage hole into the tank. During the assembling of the pump, be sure that the leakage hole is free.

To obtain the full flow rate it is recommended to choose for the pipework the nominal bore diameter of the pumps cross section for connection. Therefore pipe bends should be used, not pipe angles!

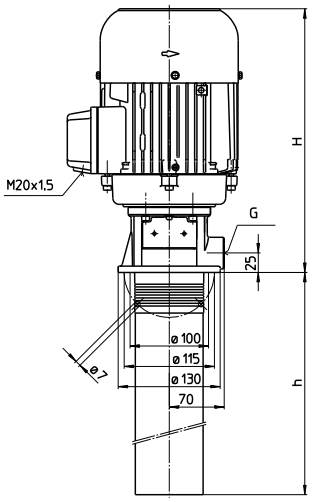
The pipework must be qualified for occuring hydraulic pressure.

STC



*) STC 40…63

TC



Dimensions in mm

ATTENTION

Pay attention of the max. tightening torque for piping connection

Type	Pipe connection	Cast iron	Brass	CrNi-steel
TC40, 63	G ¾	59 ft. lbs *(80 Nm)*	29 ft. lbs *(40 Nm)*	118 ft. lbs *(160 Nm)*
STC40, STC63	G 1	66 ft. lbs (90 Nm)		
TC160	G 1 ¼	88 ft. lbs *(120 Nm)*	44 ft. lbs *(60 Nm)*	176 ft. lbs *(240 Nm)*
STC160	G 1 ¼	88 ft. lbs *(120 Nm)*		

When installed the space around the pump must be large enough to provide sufficient cooling of the motor.

Do not prop up the pressure line via the joining socket.

5.2 Electric wiring

All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board!

According to the European Standard EN809 a motor overload must be installed and properly set to the full load amps stated on the pump name plate.

It is the responsibility of the machine operator to decide whether or not an additional emergency switch must be installed.

5.2.1 Circuit

Tension voltage and frequency must correspond with the shown specification on the nameplate.

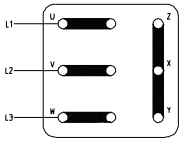
The pump must be wired so that a solid longterm electrical connection is ensured. Establish a solid ground connection.

The electrical wiring must be performed according to the wiring diagram shown inside the terminal box cover. (Please see above sample wiring diagrams)

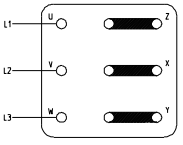
Wiring diagram e.g.

Voltage changing 1:2 YY / Y

e.g. 230 / 460 V, 60 Hz



YY
Low Voltage



Y
High Voltage

There may be no foreign objects such as dirt, particles or humidity inside the terminal board.

Mount terminal board cover to motor tight against dust and humidity and close up all unused wiring ports.

ATTENTION

When Variable Frequency Drives are used interfering signals might occur.
Non-sinus shaped supply voltage from a variable frequency drive might result in elevated motor temperatures.

6 Start-up / Shut-down

6.1 Start-up

ATTENTION

Switch off at the mains.
After connection the electrical wires, close the terminal box. Briefly start the motor (max. 30 sec.) and check the rotation according to the arrow on the top of the motor.
If the direction is incorrect change over two of the power leads.

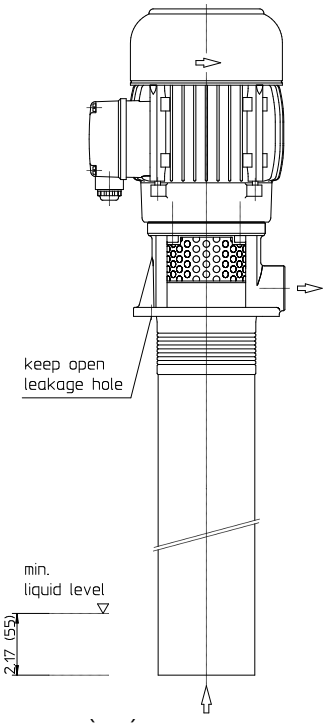
6.2 Shut-down

All service work must be carried out by qualified service personnel. Pump must be disconnected from the power source and all rotating parts must stand still. Reassure that pump is disconnected from power source and cannot be switched on. Verify that there is no voltage at the terminal board!
Open terminal box and disconnect the power leads.
Empty out the pump.

7 Operation

Liquid level

Be sure that the suction hole of the pump body is immersed about 2.17 Inches *(55 mm)* in the liquid (min. liquid level) before starting up the motor.



Dimensi

If the pump should lock up and cease, shut pump down (see 6.2) and disconnect from power supply. Pump must be uninstalled and removed from the system prior to its repair.

8 Servicing and Maintenance

ATTENTION

The surface of the motor must be kept free of dirt.

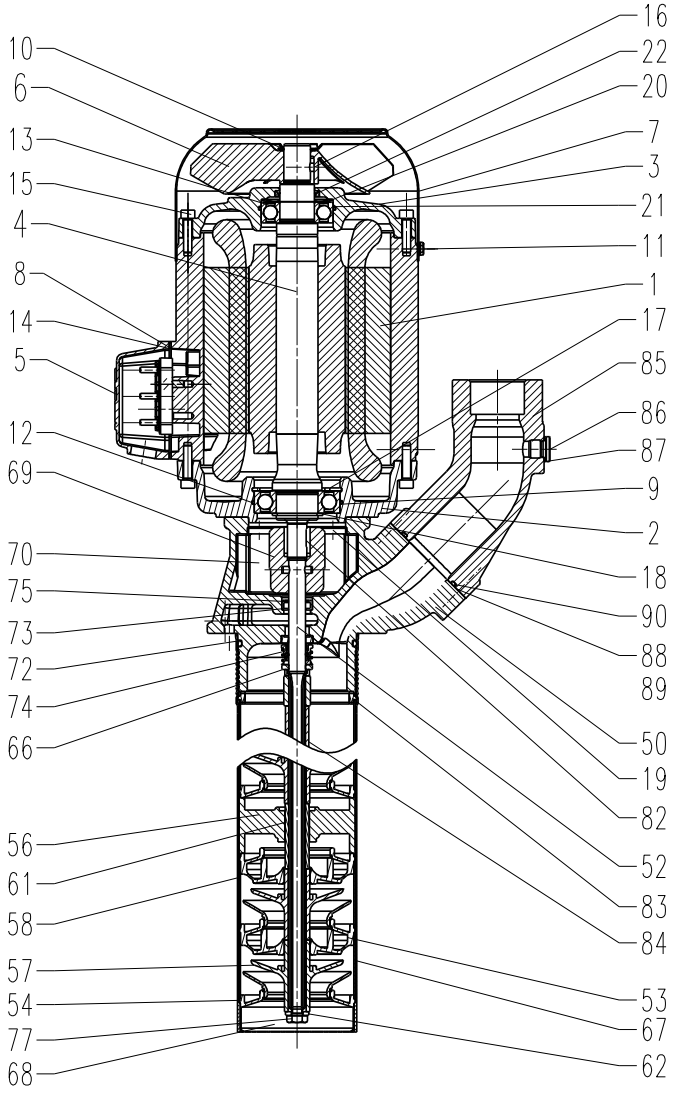
The motor shaft is spinning in permanently greased ball bearings (with special grease and increased bearing play) and does not require any special maintenance.

9 Troubleshooting Guide

Fault	Cause	Remedy
Motor does not start, no motor noise	At least two of the power supply leads have failed Overload has tripped	Check fuses, terminals and supply leads . Inspect overload
Motor does not start, humming noise	One of the supply leads has failed Impeller faulty Motor bearing faulty	See above Replace impeller Replace bearing
Overload trips	Pump locked up mechanically High on/of cycling frequency	Inspect pump hydraulics Check application
Power consumption is too high	Wrong direction of rotation of impeller Lime or other deposits mechanical friction	See above Clean pump mechanism repair pump
Motor overheats	High on/off cycling frequency Wrong power supply (voltage or cycles) Insufficient cooling	See above Power supply must correspond with name plate rating Check air flow at motor fan
Pump does not pump	liquid level too low Pump mechanism faulty Pipe blocked	Fill up liquid replace pump mechanism Clean pipe
Insufficient flow and pressure	Wrong direction of rotation of impeller Pump mechanism silted up Worn pump mechanism	Change over two power supply leads Clean pump mechanism Replace pump mechanism
Incorrect flow or pressure	Wrong power supply (voltage or cycles)	Power supply must correspond with name plate rating
Running noise/Vibration	Foreign objects in pump end Impeller damaged Bearing/Bushing broken	Remove foreign objects Replace impeller Replace bearing/bushing

10 Spare Parts

10.1 Spare Part List for the Immersion Pumps of the Series (S)TC40 ... (S)TC160



Item	Description	
1	Stator with terminal board	
2	Motor flange	
3	End shield	
4	Motor shaft with rotor	
5	Terminal box	
6	Fan	
7	Fan cover	
8	Gasket	
9	O-ring	
10	Retaining ring up to 1.5 HP *(1.1 kW)*	
10	Retaining ring up 2.0 HP *(1.5 kW)*	DIN 471
11	Thread rolling screw up 2.0HP *(1.5 kW)*	DIN 7500
12	Ball bearing	DIN 625
13	Ball bearing	DIN 625
14	Slotted cheese head screw	DIN 84
15	Stud bolt with bond up to 1.5 HP *(1.1 kW)*	
15	hexagon Socket head cap screw up 2.0 HP *(1.5 kW)*	DIN 912
16	Parallel pin	DIN 7
17	Retaining ring	DIN 472
18	Retaining ring	DIN 471
19	Socket head cap screw	DIN 912
20	Compensation disk up 2.0 HP *(1.5 kW)*	
21	O-ring up 2.0 HP *(1.5 kW)*	
22	Shaft seal up 2.0 HP *(1.5 kW)*	
50	Pump body	
52	Pump shaft	
53	Diffusor	
54	Diffusor cover	
56	Bearing stage	
57	Impeller	
58	Distance collar (Diffusor)	
61	Running sleeve	
62	Supporting ring	
66	Supporting ring	
67	Pump casing	
68	Sieve	
69	Clamp coupling	
70	Coupling shield with M5 screw	
72	O-ring	
73	Rotary shaft seal	
74	Mechanical seal	
75	Retaining ring	
77	Hexagon head screw	DIN 933
82	Woodruff key	DIN 6888
83	Ring for empty stage only for special depth of immersion	
84	Sleeve for empty stage only for special depth of immersion	
85	Joining socket STC	
86	Screw plug STC	DIN 908
87	Sealing ring STC	DIN 7603
88	Socket head cap screw STC	DIN 912
89	Spring washer STC	DIN 7980
90	O-ring STC	

10.2 Indications to the spare part order

Spare parts are available from the supplier.
Standard commercially available parts are to be purchased in accordance with the model type.
The ordering of spare parts should contain the following details:

1. **Pumptype**
   e.g. TC40S430
2. **Pump No.**
   e.g. 08156300
   The date of the construction year is a component of the pumps type number.
3. **Voltage, Frequency and Power**
   Take item 1, 2 and 3 from the nameplate
4. **Spare part with item No.**
   e.g. Impeller item No. 57

11 Repair

Exchange the rotary mechanical seal: for (S)TC40…(S)TC160

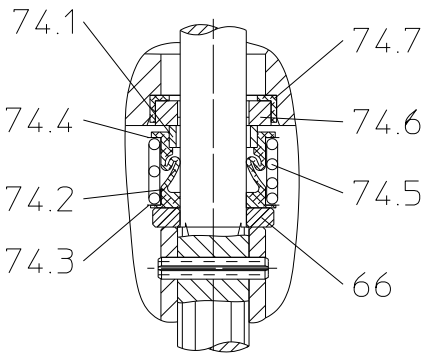
1) Disconnect the pump from the power supply.
2) Loosen the M5 screws and pull out coupling shield (70). Remove clamp coupling (69.1, 69.2) and parallel pin (76).
3) Loosen and pull off the pump casing (67) from the pump unit. **Lefthand thread!**
4) Remove the lower diffuser cover (54) out off the pump casing (67) and remove pump unit with pump shaft (52) from the pump body (50).
5) Take off rotating axial face seal unit (74.1-74.5) and the support ring (66) from the shaft (52) and clean the shaft. Pay attention to the drilled hole for the parallel pin (76) that it is without any bur.
   Check the sliding surface for the rotary shaft seal (73) for any damage.
6) Remove complete seal (74.6, 74.7) from the pump body (50) and clean the seat!
7) Mounting of the new axial face seal:
   Ensure that the sliding surfaces of the ring and the rotating axial face seal unit are free from grease and dirt.
   Moisten the angle-sleeve of the counter ring lightly with rinse water / (water with washing-up liquid) and push the unit into the seat of the pump body (50).
   Slide the support ring (66) first and then the axial face seal (74.1-74.5) onto the pump shaft (52).
8) Lubricate lightly the lip of the rotary shaft seal (73) and push it into the pump body (50). Then insert the pump shaft (52) with the pump unit through the rotary shaft seal (73).
9) Fit the coupling clamp (69.1) with the parallel pin (76) and the coupling clamp (69.2) together around the shafts. Tighten the hexagon socket head cap screws (78) with the locking washer (79) lightly.
   Be sure that the key of the motor shaft (4) coincides with the key groove of the coupling clamp (69.1).
   Press the pump shaft (52) toward the motor and tighten the screws. The distance between the two shaft ends **must be zero.**
10) Put on the difusor cover (54) onto the end of the pump unit. Lubricate the O-ring seal (72) of the pump body (50) and screw on the pump casing (67) **anticlockwise**.
11) **Fit the coupling shield (70) into the pump body (50) and screw on the M5 screws.**
12) Reconnect pump to the power supply.

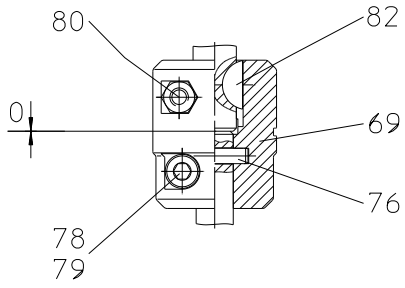
Note torques for the screw connections!

When putting the pump back into use, **make sure the direction of rotation is correct!**

Tightening torques for screwed connections

Thread - ∅	**M4**	**M5**	**M6**		**M12**
Strength classes	4.8	4.8	8.8		8.8
Tightening torque ft. lbs. *(Nm)*	**0.7 (1)**	**1.5 (2)** Item 14 **2.2 (3)** Item 15	**3.3 (4.5)**	**11 (15)** Item 77 **14.7 (20)** Clamp coupling	**22 (30)** Item 88





12 Disposal

When disposing of the pump or the packaging materials the local and national regulation for proper disposal must be complied with.

Prior to its disposal, the pump must be completely drained and decontaminated if necessary.

13 WARRANTY

Brinkmann Pumps, Inc. warrants that the product contained herein conforms to the description in Brinkmann's catalog and that if this product shall fail to conform to the description thereof or to any express or implied warranty, Brinkmann shall, upon written notice of such nonconformity within one year of the date of its shipment from BRINKMANN'S plant, repair or replace such non-conforming material at the original point of delivery. Brinkmann will furnish instructions for disposition of the goods. If, however, Brinkmann provides a written warranty, as to this specific product, which is not in conformity to the above warranty, then as to such specific product, the specific written warranty shall prevail.

In addition to the warranty that this product will conform to the description in Brinkmann's catalog and that any such non-conforming material will be repaired or replaced, as above stated, BRINKMANN further warrants that it conveys good title to this product, free of all liens of any kind whatever unknown to the first Buyer. These are the sole warranties of BRINKMANN with respect to this product. BRINKMANN MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS ARE HEREBY DISCLAIMED BY BRINKMANN AND EXCLUDED FROM THIS SALE.

The Buyer's exclusive and sole remedy on account or in respect of the product herein contained that does not conform to the description thereof, or to any express or implied warranty, shall be to secure replacement thereof as aforesaid. BRINKMANN shall not in any event be liable for the cost of any labor expended on any such material or for any special, direct, indirect, incidental or consequential damages to anyone by reason of the fact that such goods do not conform to the description thereof or to any express or implied warranty.